

Real-Time, Puncture-Detecting, Self-Healing Materials

Los Alamos National Laboratory and North Hand Protection

Our real-time, puncture-detecting, self-healing materials, called INSTALARM Materials, provide instant electrical detection of punctures in personal protective clothing, storage containers, and related hazardous-materials applications. The materials are compatible with audible, visual, or computer alarm systems, and are flexible enough to be configured for almost any application. A unique, layered construction allows INSTALARM Materials' gloves or suits to trigger an alarm when two conductive layers, sandwiched within the material, are brought into contact with one another by any piercing object. In addition, the conducting layers are of a "gooey" substance that can reclose over certain breaches, making the material self-healing for many applications.

Applications

INSTALARM Materials can be used for puncture detection in the following areas:

- personal protective equipment—gloves, garments, biohazard suits, masks;
- containers—storage containers (for chemicals, biohazards, radionuclides), disposal bags, natural gas lines, and oil pipelines;
- environmental containment—geomembranes (hazardous-waste sites/landfills and petroleum-storage areas); and
- other applications for which it is important to know if and when a breach has occurred.

Benefits

INSTALARM Materials can benefit industry and research institutions by

- minimizing workers' exposure to chemicals, biohazards, and radioactive contamination by instantaneously warning of material punctures;
- eliminating the need for time-consuming glove-testing procedures;
- increasing workers' confidence in their ability to safely perform hazardous tasks within critical time periods; and
- allowing immediate implementation of emergency procedures in the event of a breach.



The glove shown here in a glovebox situation is made of real-time, puncture-detecting, self-healing materials, called INSTALARM Materials. A puncture or tear of the materials' electrically conducting inner layers sets off an alarm, displayed here as a small red light with a battery powered source. The five-layer system, two layers of which are a gooey, conductive material, offers both immediate alarm capability and self-healing characteristics for punctures and small tears.

Availability of applications for commercial licensing

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